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THE GOVERNMENT OF THE PHILIPPINE ISLANDS
DEPARTMENT OF THE INTERIOR
BUREAU OF SCIENCE
MANILA

BIRDS IN THEIR ECONOMIC RELATION TO MAN[1]

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INTRODUCTION

It is generally realized that birds are important and valuable to man from an esthetic standpoint, as a source of food, in carrying the seeds of certain fruits and grains to places where they have never been known, and as an incentive to outdoor sport. However, their greatest value is in their efficient control of weeds, snakes, small mammals such as rats and mice, and insects that eat and destroy our plants and trees.

It is the purpose of this Bulletin to suggest how we may recognize the value of our birds by studying and protecting them; it is also the purpose to emphasize some of the more important benefits which the Filipino people may derive from an appreciation of their wild birds and from an increased interest in them. As an evidence that there is developing an interest in this subject among the Filipino people, it might be stated that the recent Agricultural Congress of the Philippine Islands indorsed the work now being undertaken by the Bureau of Science in ascertaining what birds are helpful to agriculture, either in destroying injurious insects or in eating the seeds of plants which are a pest to crops. The Secretary of the Agricultural Congress, Sr. Augusto Gonzales, very kindly called the attention of the Bureau of Science to an experience of his own in

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[1] Issued December 29, 1915. Bureau of Science press bulletin No. 32, revised.

1914 when he observed a large flock of black birds in Pangasinan, locally known by the name "martinez" (*Ætheopsar cristatellus*), which settled upon a field in which great numbers of locust eggs had been deposited. The field had been plowed in order to expose the eggs. These were voraciously devoured by the birds. Perhaps you, who read this, may have observed birds in their work of insect destruction, and if such is the case you would be serving the agricultural and general economic interests of the Islands by reporting your observations to the Bureau of Science, describing as fully as possible the particular kind of birds observed, giving color, size, local name, and any other details which may occur to you. It would also be valuable to know the class of insects attacked, the numbers disposed of, etc. From observations which I myself have made and from those reported to me by others, I believe that chickens and turkeys eagerly catch and eat locusts of all sizes, from the hopper to the adult. It can readily be seen that if every Filipino farmer will interest himself in increasing his poultry raising, there will be developed one of the most reliable and efficient methods of controlling the very destructive locusts as well as many other injurious insects.

It scarcely needs to be pointed out that poultry is an important source of wealth. The possibilities of this industry cannot be realized by those who have not seen poultry farming on a large scale. In some cases the fowls are raised for market and in other cases particular attention is paid to the production of eggs, for which there is always a demand at good prices. The Philippine Islands import many thousands of pesos worth of eggs a year which would not be necessary if poultry raising received more attention from the Filipino people. Domestic fowls, and especially turkeys, because of their greater size and much greater stomach capacity, are even more efficient than wild birds in the destruction of insects. Very few turkeys are raised in the Philippine Islands, and these bring fancy prices when offered for sale in the Manila markets. Young turkeys are sensitive to dampness and for this reason are usually considered to be more difficult to raise than chickens. Young poultry of any kind should not be turned out while the grass is wet, and even if turkeys demand a little extra care they are worth it.

This is not a plea for the establishment of a few large poultry farms or large flocks of turkeys. The best results in the control of insects will be secured if each household owns a few turkeys and as many chickens as it can conveniently care for. The money and labor to be expended are slight, and the aggregate wealth and benefit to agriculture reasonably to be expected are very great.

The part that wild birds play in checking the locust pest is very important. Because of their size and smaller stomach capacity, they undoubtedly feed more upon the very young locusts and each bird will eat a great many of them. As a result swarms of adult locusts are less frequently developed than if there were no birds. What proportion of the locusts wild birds are able to kill is a matter difficult to estimate. The greatest consumption of insects is during the time that young birds are being fed in the nest. A nestling bird daily consumes one half its weight in insects. An adult bird of the size of the red-winged coucal, or sabacot, eats about 2.5 kilograms of insects during a year. It is very interesting to see hawks, beebirds, rollers,

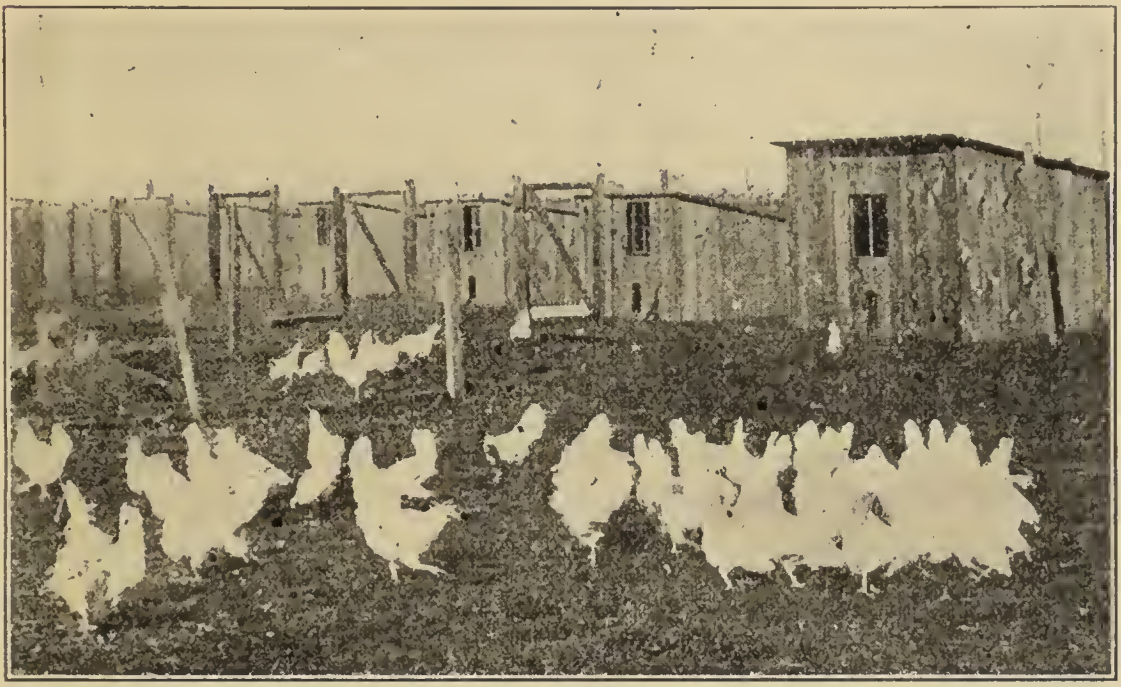

FIG. 1. Colony poultry houses and pure breed fowls. (From British Columbia Department of Agriculture Bull. No. 63.)

and birds of other families feeding together in the midst of a dense cloud of locusts.

The study of birds and their habits with regard to (1) whether they injure agriculture by eating fruits, grains, etc., that the farmer is raising for his own benefit, or (2) whether they aid agriculture by eating injurious insects and the seeds of undesirable plants or weed, or (3) whether they neither help nor hinder by their feeding habits is known as economic ornithology. Birds of the first class are known as "injurious," of the second class as "beneficial," and of the third class as "neutral."

The recognition of the part played by birds in the protection of crops, orchards, and forests has grown with the development of economic ornithology and is comparatively recent. The earliest information concerning the food of most birds was fragmentary or consisted of deductions from insufficient data. This led to statements and beliefs some of which are now known to be entirely erroneous. For example, thirty years ago in the United States hawks and owls were almost universally looked upon as injurious to man's interest, and thousands of them were killed each year because they sometimes ate chickens. There are a very few species which live almost exclusively on chickens and game birds, but most hawks and owls eat hundreds of field mice to each chicken they kill and, therefore, deserve to be protected. These facts were determined by the Biological Survey of the United States Department of Agriculture from a study of the stomach contents of hundreds of birds. Similar results have been obtained in the same way with regard to the predacious birds of Europe.

The Bureau of Biological Survey has done more work on economic ornithology than any other single institution. Since this line of study was begun in 1885, over sixty thousand stomachs have been examined and some of the results have been published in more than one hundred thirty papers. These deal with such subjects as Birds as conservators of the forest, Birds of California in relation to the fruit industry, The relations between birds and insects, The hawks and owls of the United States in their relation to agriculture, and The relation of sparrows to agriculture.

The kind of work that is being done by the Bureau of Biological Survey in the United States is being done by the Bureau of Science in the Philippine Islands. Almost nothing is known of the food habits of birds of tropical countries, and the subject is of the greatest economic importance as well as of much scientific interest. Results of economic importance are being obtained as rapidly as possible.

Investigations are carried along three lines: Inquiries in the form of circular letters and blanks, sent to farmers and others who are likely to have such information; examination of the stomachs from each species when enough material has accumulated; and field studies of specific problems with subsequent examination of the specimens collected.

In the field work an ornithologist goes into any given agricultural region and collects specimens of large numbers of species of birds in as many different months as may be practicable. From the examination of the stomach contents and from his field notes he determines the species of birds that eat grain and fruit, those that eat beneficial insects, and those that eat weed seeds and injurious insects. When the beneficial species of birds are determined, efforts may be made to protect them. Those of no benefit may be neglected, and the injurious ones may be killed.

It is not intended to present here a final statement as to the food of any Philippine bird, but merely to suggest the probable economic status of a few common and well-known species and families.

Crows.—Throughout the Philippines the common crow (*uac*)[2] is very generally looked upon as worthy of death for several reasons. Where unmolested, it is fearless and will even enter a house to carry off pieces of meat and fish; it has been seen to carry off young chickens bodily, and it is very generally credited with destroying small coconuts by pecking holes in them. No good trait of the crow is known, but it would be unjust to condemn it without a careful study of its habits throughout the year.

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[2] *Corone philippina* (Bonaparte).

Hawks and owls.—The hawks (*limbas, manaol, lauin*) and owls (*cuago, bucao*) of the Philippines subsist upon beetles, locusts, frogs, and snakes. Some of the hawks [3] are very industrious in catching locusts whenever these appear in great numbers. One species [4] feeds upon the larvæ of wild bees, while another [5] subsists upon wild ducks and probably to some extent upon domestic birds. One of the very small hawks [6] has been seen catching butterflies on the wing.

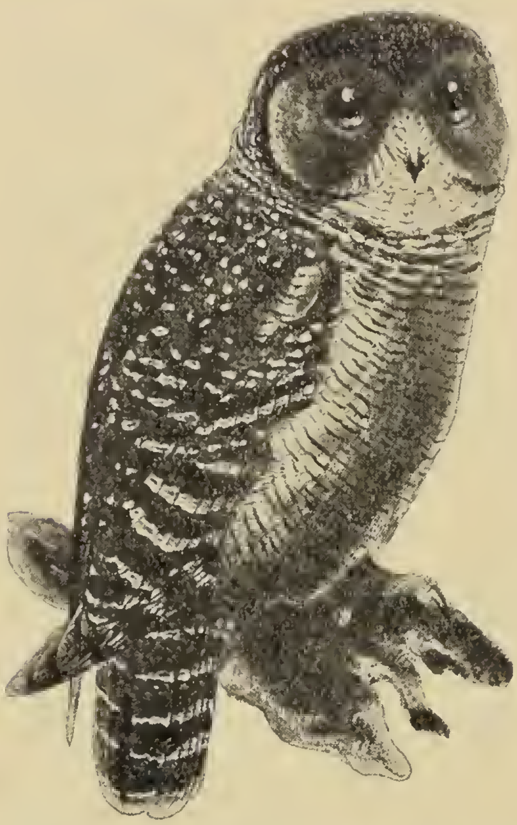

Fig. 2. A Philippine owl, *Syrnium whiteheadi* Sharpe. (From The Ibis, 1888.)

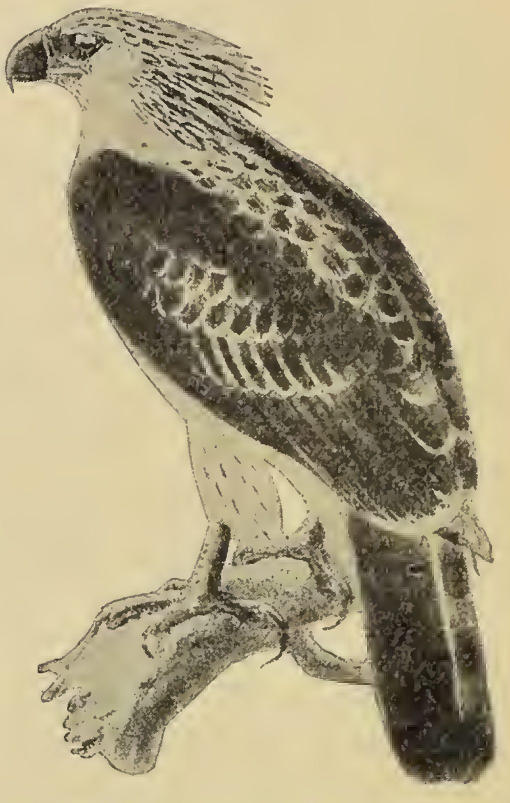

Fig. 3. Monkey-eating eagle, *Pithecophaga jefferyi* Grant. (From The Ibis, 1897.)

Doves and pigeons.—The common doves (*batobato*) [7] are fond of seeds. At times some of them eat a great deal of palay, but as this is mostly waste left on the ground after harvest and as they eat perhaps an equal quantity of weed seeds, the doves are probably beneficial. The large pigeons of which there are several species, generally known as *balud* or *baud*,[8] inhabit forests, where they search out whatever trees are in fruit. They are very fond of pili nuts and of the fruit of certain fig trees and consume enormous quantities of the round fruit of the buri palm. There are other fruit-eating pigeons (*limucon, tucmo, capilla, camasu*)[9] less well known, but all of them are probably of benefit in scattering the seeds of forest trees.

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[3] *Haliastur intermedius* Gurney.

[4] *Pernis ptilorhynchus* (Temminck).

[5] *Falco peregrinus* Tunstall and other species of this genus.

[6] *Microhierax erythrogenys* (Vigors).

[7] *Streptopelia dussumieri* (Temminck), *Œnopopelia humilis* (Temminck), and *Geopelia striata* (Linnæus).

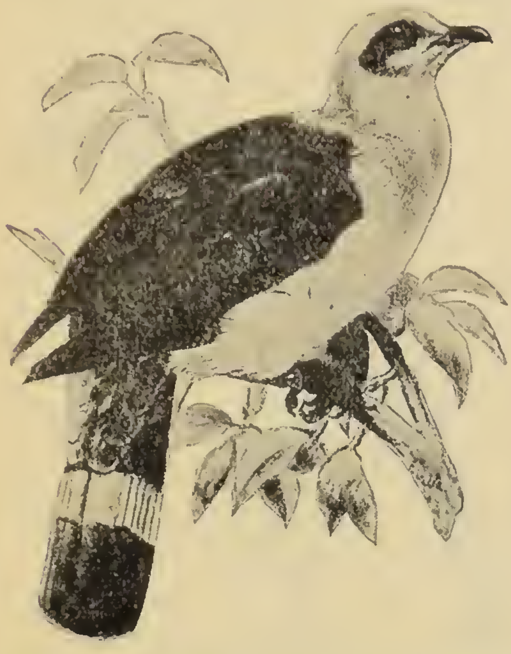

FIG. 4. Mindoro zone-tailed pigeon, *Zonophaps mindorensis* (Whitehead). (From The Ibis, 1896.)

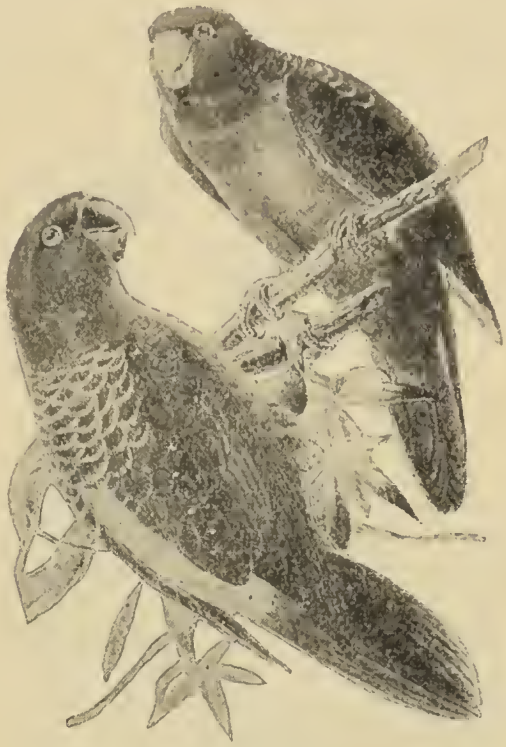

FIG. 5. A Philippine parrot, *Tanygnathus everetti* Tweeddale. (From Cat. Birds Brit. Mus., vol. 20.)

Parrots.—The parrots (*pericos*)[10] are willing to eat either grain or fruit and sometimes take corn in the ear before it is ripe enough to harvest. The smallest species

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[8] *Muscadivores chalybura* (Bonaparte) and closely related species of this genus.

[9] Species of the genera *Osmotreron, Phapitreron,* and *Leucotreron,* each represented by two or more species. The camasu, or nutmeg pigeon, *Myristicivora bicolor* (Scopoli), is the only species of its genus.

[10] The genera *Tanygnathus* and *Prioniturus* with representatives in different islands.

(*colasisi*)[11] is particularly fond of tuba and can usually be found in any coconut grove where the sap for this drink is being collected. Not enough is known of the tastes of any of the parrots to warrant a definite statement as to their economic status.

Kingfishers.—The kingfisher family, the pescadores, is very well represented in the Philippines. Some species[12] live about streams and lakes, where they pursue the traditional occupation of the family. The common, large kingfishers are inclined to be quarrelsome with other birds, and one was seen killing a half-grown chicken by pecking it on the top of the head. Others[13] have taken to a forest life and seemingly never go near the water. The food of the latter consists of shells, insects, and small reptiles.

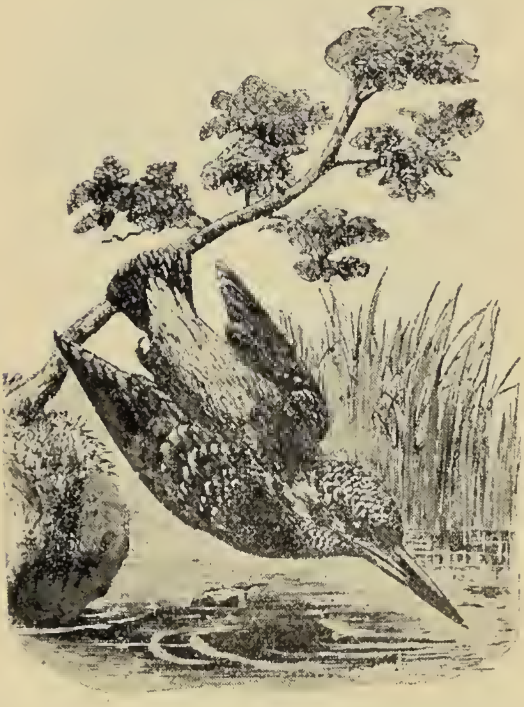

FIG. 6. A kingfisher, *Alcedo ispida* Linnæus. (From Coues after Dixon.)

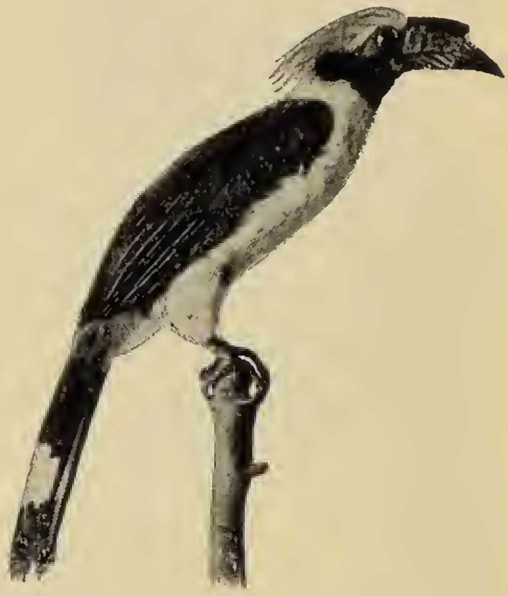

FIG. 7. Luzon tarictic, *Penelopides manillæ* (Boddaert). (From a specimen mounted in the Bureau of Science.)

Cuckoos.—The cuckoo family is another that is represented by many and varied kinds. It includes the large black *cuhao,*[14] the grass-loving *sabacot,*[15] and various smaller and less known forest-inhabiting kinds. The cuckoos are very industrious in their search for insects, of which they consume enormous quantities. They are not annoyed by the hairs of certain larvæ, but eat these, hairs and all. Some cuckoos are so devoted to certain evil-smelling bugs that they acquire a somewhat similar odor. Beetles, bugs, locusts, caterpillars, spiders, and snails are all welcome to the cuckoos. The cuckoo family is especially important because many of the species are among the largest of insect-eating birds; therefore, they destroy a larger bulk of insects per bird than do small birds, such as nuthatches, flycatchers, and chickadees.

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[11] *Loriculus philippensis* (P. L. S. Müller) and several other species of this genus.

[12] *Halcyon chloris* (Boddaert), *Halcyon gularis* (Kuhl), and *Alcedo bengalensis* Gmelin.

[13] *Halcyon lindsayi* (Vigors), *H. hombroni* (Bonaparte), *H. moseleyi* (Steere), and some of the small species of the genus *Ceyx*.

Hornbills.—The large and bizarre birds known as hornbills (the largest known to Filipinos as *calao,* or *cao,*[16] and a smaller kind known as *tarictic,* or *talictic*[17]) must consume great quantities of forest fruits and thus help to scatter the seeds in new localities. They are also helpful to a certain extent in killing beetles, but just what part they play in the economics of the forest is not known.

Woodpeckers.—The woodpeckers (*carpintero,* or *pica madera*) are especially fitted for working in wood, and there is no reason to believe that they will be found to be anything but beneficial to the trees, which they relieve of the grubs embedded in the bark and wood.

Swallows, swifts, and nighthawks.—The swallows, swifts, and nighthawks are excellent examples of how species not closely related may be very similar in superficial appearance. All these birds have short legs, small and weak feet, long wings which give them swift flight, and large mouths. These features fit them for the pursuit of what they eat, namely, flying insects. The first two destroy vast numbers of gnats, mosquitoes, and other small flying insects. During the day they are constantly on the wing. The swallows (*laiang laiang*) occasionally rest during the day, but the swifts (*buta buta, saiao*) probably remain in flight until they go to roost in a cave or a hollow tree. As the light of day fades and the largest stars can first be distinguished, a bird several times larger than a swallow sails over the land. This is a nightjar. This bird is often called a nighthawk, and it might with equal propriety be called a nightswift or a nightswallow. In many countries it is called goatsucker (Spanish, *chotacabras*) from an old belief that it sucked milk from goats. In some parts of the Philippines it is called *tucaro* in imitation of its call. The nightjars begin the work of insect destruction at the time when the swallows and swifts have gone to rest.

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[14] *Eudynamys mindanensis* (Linnæus).

[15] *Centropus viridis* (Scopoli). This is the most abundant and best-known species of the genus, but several others, some of them larger than *C. viridis,* are conspicuous in various localities. Among these are *Centropus unirufus* (Cabanis and Heine), *C. melanops* Lesson, and *C. sinensis* (Stephens).

[16] *Hydrocorax hydrocorax* (Linnæus) and two other species of this genus.

[17] *Penelopides manillæ* (Boddaert) and several other species of this genus in different islands.

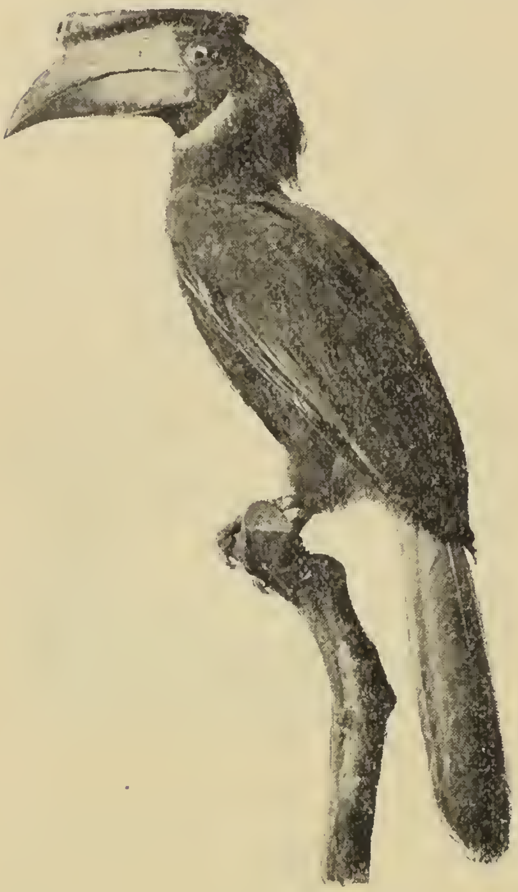

FIG. 8. Luzon calao, *Hydrocorax hydrocorax* (Linnæus). (From a specimen mounted in the Bureau of Science.)

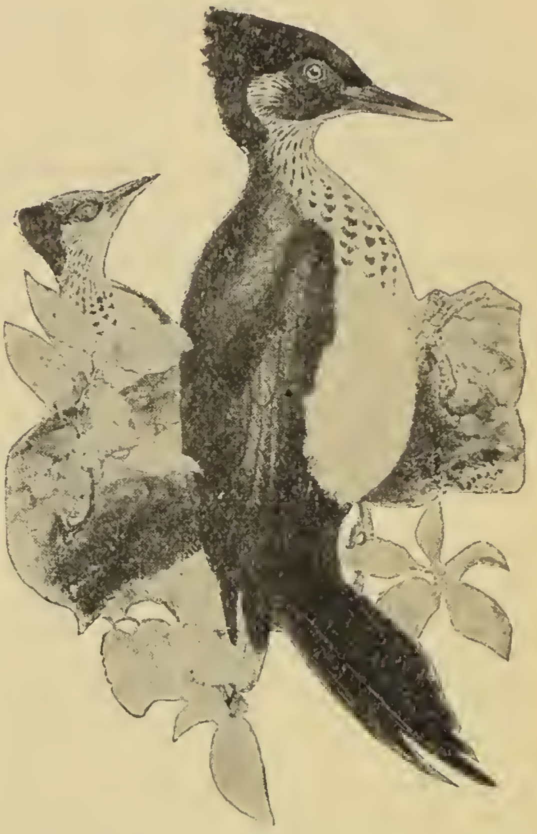

FIG. 9. A large Philippine woodpecker, *Thriponax pectoralis* Tweeddale. (From Cat. Birds Brit. Mus., vol. 18.)

Rice birds.—The weaver finches, or rice birds, are probably the worst pest in the way of birds to be found in the Islands. The Philippine weaver (*maiya*)[18] is very abundant and descends in clouds upon rice seed beds and upon the ripening grain a short time before the rice harvest. Although there is no doubt that the rice birds do a great deal of damage, the period during which they eat rice is short and their food during the rest of the year is probably weed seeds. Therefore, it would be unjust to consider the rice birds wholly injurious unless they are found to do damage throughout the year.

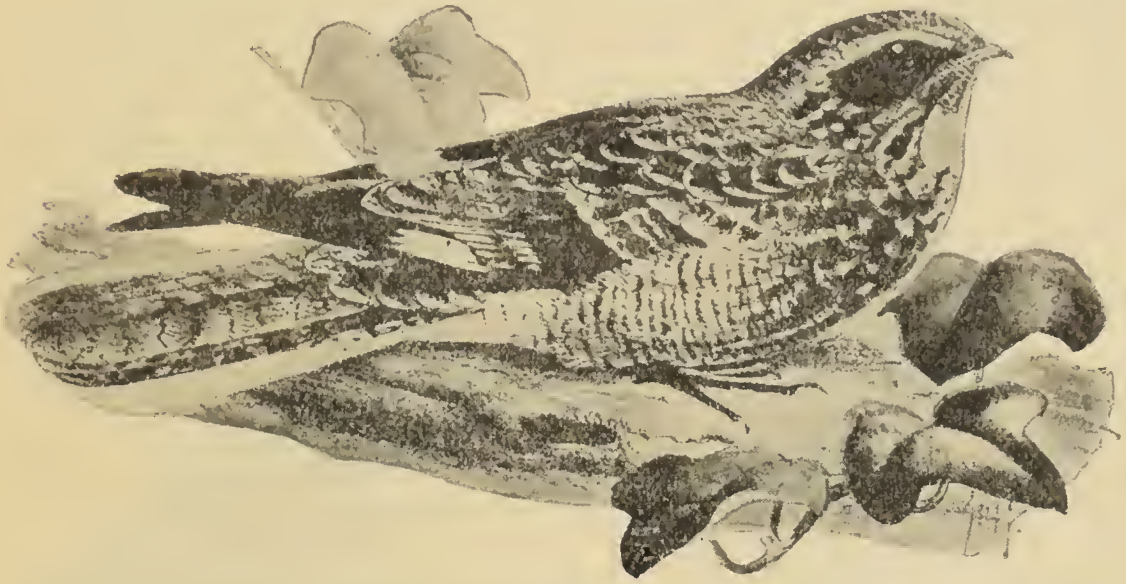

FIG. 10. A Philippine nightjar, *Caprimulgus griseatus* Tweeddale. (From Cat. Birds Brit. Mus., vol. 16.)

Shore birds and water birds.—The food of Philippine shore and water birds has not been thoroughly studied; in fact, very little is known about these birds. The food of two species may be noted as suggestive that other important facts with regard to these classes remain to be discovered. Recently examined specimens of the Philippine grebe (*suliasit*)[19] from Lake Bay show that this species is very partial to a small species of shrimp. Thus, this bird may be of economic importance in relation to the shrimping industry.

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[18] *Munia jagori* Martens is the common rice bird. *Munia cabanisi* Sharpe is equally abundant in some localities, while *Uroloncha everetti* (Tweeddale), a much rarer species, on one occasion was seen eating rice in a seed bed.

[19] *Tachybaptus philippensis* (Bonaterre).

Specimens of the moorhen (*uluc*)[20] from the same locality had eaten a large percentage of a tabanid fly larva. This may possibly be the larva of *Tabanus striatus,* which is believed to be an agent in the transmission of surra.

Miscellaneous insectivorous birds and their protection.—There are many kinds of small birds that search every tree and thoroughly inspect each twig and leaf so that insects, even the smallest and least conspicuous, must be very careful in order to avoid being eaten. Among these birds are many flycatchers and species of several related families. There are also shrikes, chickadees, nuthatches, creepers, silver-eyes, sunbirds, and many others. These small insect-eating birds are among the farmers' best friends. They are of no use for food and very few of them can live in captiv-

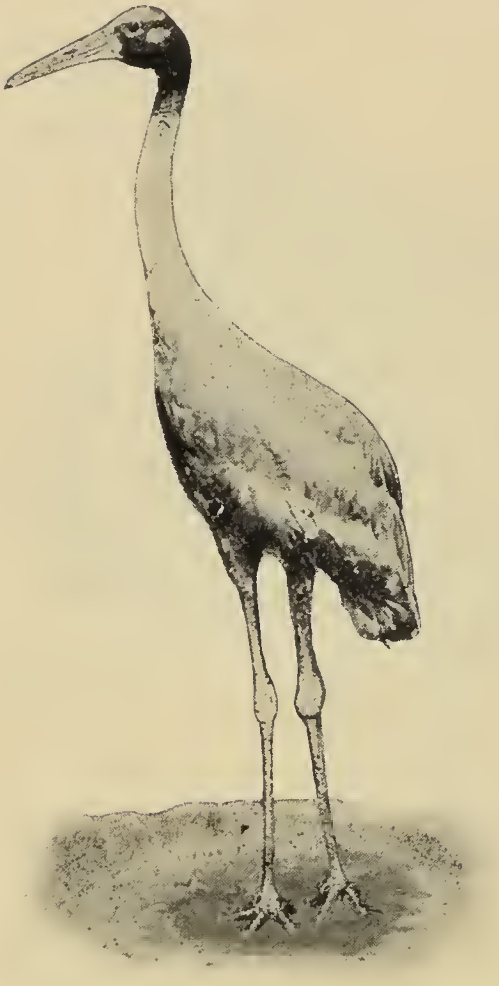

FIG. 11. Crane or tipol, *Antigone sharpi* Blanford. A species of great value to the farmer. (From a living bird.)

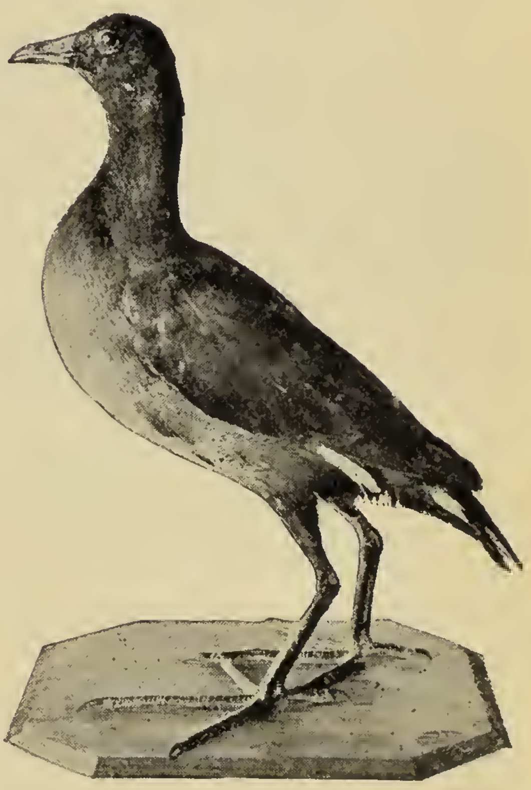

FIG. 12. Moorhen, *Gallinula chloropus* (Linnæus). (From a specimen mounted in the Bureau of Science.)

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[20] *Gallinula chloropus* (Linnæus).

ity, so that they should not be killed nor snared. Rather they should be encouraged to live in the neighborhood of houses. This can be done to some extent by preventing their being shot or trapped and by protecting their nests and young. Crows eat the eggs and young of wild birds as well as of chickens and should be killed or driven away from the vicinity of houses. In some places a supply of clean water will attract birds to bathe and drink. In the United States birds that naturally nest in holes, such as nuthatches and chickadees, take very readily to nesting boxes, which may be nailed in trees, to fence posts, and in other sites. One of the worst enemies of small birds, especially during the nesting season, is the stray cat. Cats that are fed and are kept close to the house may do very little killing, but when forced to find their own food, cats kill so many birds that the farmer should not hesitate to put them out of the way. Boys, especially when equipped with air guns, are responsible for killing or scaring away many useful birds. A boy with a gun must shoot at something, but he should be shown that insectivorous birds are too valuable to be expended for target practice. Let him confine his attention to crows, which are certainly of no use about a farm house or coconut grove.

Societies for bird protection.—In many countries there are societies whose object is to protect useful and beautiful wild birds. These societies stimulate interest in birds by publishing information concerning the value of well-known birds, by encouraging the building of bird houses, by illustrated lectures, and by the introduction of bird study in schools. The object of this work is to develop respect and admiration for birds through knowledge of their habits. In the United States this work is carried on by the National Association of Audubon Societies, named in honor of John James Audubon, a very famous artist and lover of birds. The National Association is made up of the state societies, which in turn have local societies in the towns. Besides its educational work the Association has carried on aggressive campaigns for the establishment of bird reserves, for reform of game laws, and for laws protecting nongame birds and prohibiting the sale of the feathers of wild birds for millinery purposes. The Biological Survey has been very active in urging the passage of adequate state laws and of the federal act for the protection of migratory game birds.

The Philippine Legislature has passed an act (No. 1798) for the protection of wild birds and wild animals. This law is very good, so far as it goes, but its enforcement is not an easy matter, and in order adequately to protect wild bird life in the Philippine Islands, the coöperation of every inhabitant of the Islands is most desirable. It is believed that the greatest amount of good in this direction can be accomplished by the schools and the municipal officials. It is believed that the time is opportune for the organization of a society in the Philippine Islands, such as the Audubon Association, which might have a branch in each province, which in turn would have branches in each town. To bring about such an organization, national coöperation is necessary, and the Bureau of Science would be very glad to hear of and support any interest in such a movement.

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